WATER SUPPLY OUTLOOK
and
FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS
for
MONTANA

UNITED STATES DEPARTMENT of AGRICULTURE···SOIL CONSERVATION SERVICE,
and
MONTANA AGRICULTURAL EXPERIMENT STATION

Data included in this report were obtained by the agencies named above in cooperation with Federal, State, and private organizations listed on the inside back cover of this report.

AS OF
FEB. 1, 1964

UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

To Recipients of Water Supply Outlook Reports:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from advance estimates of the streamflow.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, up to 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

Streamflow forecasts are obtained by a comparison of total or maximum snow accumulation, as measured by snow water equivalent, to the subsequent spring and summer or snowmelt season runoff over a period of years. The snow water equivalent measured in selected snow courses provides most of the index to the streamflow forecast for the following season. More accurate forecasts are usually obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast procedure. Early season forecasts assume average climatic conditions through the snowmelt season.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions. Soil Conservation Service Reports may be secured from Water Supply Forecasting Unit, Soil Conservation Service, P.O. Box 2807, Portland, Oregon 97208.

PUBLISHED BY SOIL CONSERVATION SERVICE

REPORTS	ISSUED	LOCATION	COOPERATING WITH
RIVER BASINS			
WESTERN UNITED STATES	MONTHLY (FEB.-MAY)	PORTLAND, OREGON	ALL COOPERATORS
BASIC DATA SUMMARY	OCTOBER 1	PORTLAND, OREGON	ALL COOPERATORS
STATES			
ALASKA	MONTHLY (MAR.-MAY)	PALMER, ALASKA	ALASKA S.C.D.
ARIZONA	SEMI-MONTHLY (JAN.15 - APR.1)	PHOENIX, ARIZONA	SALT R. VALLEY WATER USERS ASSOC. ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO	MONTHLY (FEB.-MAY)	FORT COLLINS, COLORADO	COLO. STATE UNIVERSITY COLO. STATE ENGINEER N. MEX. STATE ENGINEER
IDAHO	MONTHLY (JAN.-JUNE)	BOISE, IDAHO	IDAHO STATE RECLAMATION ENGINEER
MONTANA	MONTHLY (JAN.-JUNE)	BOZEMAN, MONTANA	MONT. AGR. EXP. STATION
NEVADA	MONTHLY (JAN.-MAY)	RENO, NEVADA	NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES - DIVISION OF WATER RESOURCES
OREGON	MONTHLY (JAN.-JUNE)	PORTLAND, OREGON	OREG. STATE UNIVERSITY OREGON STATE ENGINEER
UTAH	MONTHLY (JAN.-JUNE)	SALT LAKE CITY, UTAH	UTAH STATE ENGINEER
WASHINGTON	MONTHLY (FEB.-JUNE)	SPOKANE, WASHINGTON	WN. STATE DEPT. OF CONSERVATION
WYOMING	MONTHLY (FEB.-JUNE)	CASPER, WYOMING	WYOMING STATE ENGINEER

PUBLISHED BY OTHER AGENCIES

REPORTS	ISSUED	AGENCY
BRITISH COLUMBIA	MONTHLY (FEB.-JUNE)	WATER RESOURCES SERVICE, DEPT. OF LANDS, FOREST AND WATER RESOURCES, PARLIAMENT BLDG., VICTORIA, B.C., CANADA
CALIFORNIA	MONTHLY (FEB.-MAY)	CALIF. DEPT. OF WATER RESOURCES, P.O. BOX 388, SACRAMENTO, CALIF.

WATER SUPPLY OUTLOOK

FEDERAL-STATE-PRIVATE COOPERATIVE SNOW SURVEYS

for

MONTANA

Report Prepared

By

Phillip E. Farnes

and

Stanley E. Cook

Snow Survey and Water Supply Forecasting Section
Soil Conservation Service
Box 855
Bozeman, Montana

Issued By

H. D. Hurd
State Conservationist
Soil Conservation Service
Bozeman, Montana

J. A. Asleson, Director
Montana Agricultural
Experiment Station
Bozeman, Montana

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RESERVOIR STORAGE DATA	7
LIST OF COOPERATORS	Inside Back Cover

MONTANA
WATER SUPPLY OUTLOOK
as of
February 1, 1964

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* * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                   *
* The water supply outlook for the coming irrigation *
* season has improved somewhat during the past month *
* but remains below average.  February 1 snow water  *
* content is almost double that which was measured   *
* on the January 1 surveys, and is generally 10 to   *
* 20 percent below average.                          *
*                                                   *
* Mountain soil moisture and storage in irrigation   *
* reservoirs are below average.                      *
*                                                   *
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West of the Continental Divide, streamflow during the spring and summer months should be adequate in most drainages of the state. The present outlook for the April through September streamflow is 5 to 15 percent below average, assuming near average precipitation in the mountains during the next few months.

East of the Continental Divide, streamflow should provide an adequate irrigation water supply except in the Milk and Marias River drainages in the northern portion of the state and in the Rock Creek and Red Lodge Creek drainages near Red Lodge in the southern portion of the state. If snow accumulation is below average during the next three months, shortages of irrigation water could occur on other Missouri and Yellowstone tributaries as mountain soil moisture and reservoir storage are generally below average.

Snow surveys made near the first of February in the Kootenai River basin in British Columbia indicate the mountain snow pack is 105 percent of last year and 78 percent of the 1943-57 average.

In the Flathead River drainage the snow pack shows a good increase and is now 50 percent more than last February 1 and 84 percent average.

MONTANA
WATER SUPPLY OUTLOOK
as of
February 1, 1964

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*  20 percent below average.                            *
*                                                       *
*  Mountain soil moisture and storage in irrigation     *
*  reservoirs are below average.                        *
*                                                       *
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Snow surveys made near the first of February in the Kootenai River basin in British Columbia indicate the mountain snow pack is 105 percent of last year and 78 percent of the 1943-57 average.

In the Flathead River drainage the snow pack shows a good increase and is now 50 percent more than last February 1 and 84 percent average.

The Clark Fork River has a mountain snow cover that is 123 percent of a year ago and 106 percent average.

Only two snow courses were measured in the Bitterroot River drainage. The courses recorded 87 percent more water than a year ago and 8 percent more than the 15 year average.

East of the Continental Divide the snow pack on the headwaters of the Missouri River is about 15 percent greater than last year and 82 percent average on the Jefferson; 54 percent above last year and 88 percent average on the Madison; and 12 percent less than a year ago and 93 percent average on the Gallatin.

Along the Main Stem of the Missouri River, between Canyon Ferry Reservoir and Great Falls, the mountain snow pack is 108 percent of last year and 108 percent average.

In the headwaters of the Yellowstone River above Billings the water content of the snow pack is 22 percent more than a year ago and 82 percent average.

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Only two snow courses were measured in the Bitterroot River drainage. The courses recorded 87 percent more water than a year ago and 8 percent more than the 15 year average.

East of the Continental Divide the snow pack on the headwaters of the Missouri River is about 15 percent greater than last year and 82 percent average on the Jefferson; 54 percent above last year and 68 percent average on the Madison; and 12 percent less than a year ago and 93 percent average on the Gallatin.

Along the Main Stem of the Missouri River, between Canyon Ferry Reservoir and Great Falls, the mountain snow pack is 108 percent of last year and 108 percent average.

In the headwaters of the Yellowstone River above Billings the water content of the snow pack is 22 percent more than a year ago and 82 percent average.

SNOW COURSES
AND SOIL MOISTURE STATIONS
IN
MONTANA
LEGEND
TOWNS AND CITIES
13004 SNOW COURSE
13004 SOIL MOISTURE STATION
13004 SNOW COURSE & SOIL MOISTURE STATION
DRAINAGE BOUNDARIES
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE
BOZEMAN, MONTANA
SCALE IN MILES
50 25 0 50 100
KOOTENAI
ST. MARY
MILK
MARIAS
MILK
CLARK FORK
FLATHEAD
TETON
SUN
MAIN STEM
MISSOURI
BLACKFOOT
JUDITH
MUSSELSHELL
LOWER YELLOWSTONE
YELLOWSTONE
BITTERROOT
BIG HOLE
JEFFERSON
GALLATIN
UPPER YELLOWSTONE
RUBY
MADISON
BEAVERHEAD
IDAHO
SOUTH DAKOTA
MONTANA
WYOMING
SHELBY
HAVRE
GLASGOW
FORT PECK RESERVOIR
LIBBY
KALISPELL
COLUMBIA FALLS
POLSON
THOMPSON FALLS
PLAINS
ST REGIS
MISSOULA
HAMILTON
DARBY
ANACONDA
BUTTE
HELENA
GREAT FALLS
CHOTEAU
AUGUSTA
LEWISTOWN
HARLOWTON
WILSALL
BOZEMAN
LIVINGSTON
BILLINGS
MILES CITY
DILLON
OGDEN
RED LODGE
SEELEY LAKE
OVANDO
HUNGRY HORSE RESERVOIR
BIGSON RESERVOIR
CANYON FERRY RESERVOIR
FLATHEAD LAKE
REVISED 10-63
5R-11,484

INDEX TO MONTANA SNOW COURSES AND SOIL MOISTURE STATIONS

SNOW COURSES

COLUMBIA RIVER BASIN

Drainage Basin & Course Name	Number	Elev.	Sec.	Twp.	Range	Record Began	Measuring Dates 1/	Meas. By 2/
KOOTENAI RIVER								
Bares Creek	15B11	5500	36	26N	31W	1956	3,4,5,5½	2
Brush Creek	14A04	5000	12	30N	26W	1937	3,4,5	1,2
Red Mountain	15A01	6000	4	36S	29W	1937	3,4,5,5½,6	1,2
Weasel Divide	14A07	5450	8	37N	24W	1937	3,4,5,5½,6	1,2
FLATHEAD RIVER								
Bassoo Peak	14B03	5150	11	24N	25W	1961	3,4,5	1,5
Big Creek	13B03	6750	7	22N	18W	1941	3,4,5, 6	1,5
Camp Misery	13A17	6400	30	28N	18W	1962	3,4,5,	1,2
Desert Mountain	13A02	5600	24	31N	19W	1937	1,2,3,4,5, 6	1,2
Fatty Creek	13B04	5500	4	22N	18W	1962	3,4,5, 6	1,5
Griffin Creek Divide	14A09	5150	11	28N	25W	1960	3,4,5	1,5
Hell Roaring Divide	14A03	5770	35	32N	22W	1942	1,2,3,4,5,5½,6	2
Holbrook	13B13	4530	18	21N	13W	1951	2,3,4,5	1
Kishenehn	14A06	3890	14	37N	22W	1954	3,4	6
Logan Creek	14A05	4300	34	30N	24W	1937	3,4,5	1,2
Marias Pass	13A05	5250	34	30N	14W	1934	1,2,3,4,5	3
Mineral Creek	13A16	4000	29	35N	17W	1957	3,4,5	6
North Fork Jocko	13B07	6330	3	17N	17W	1941	3,4,5,5½,6	1,5
Spotted Bear Mountain	13B02	7000	23	25N	15W	1948	1,2,3,4,5	1,2
Strawberry Lake	13A10	5600	11	28N	19W	1948	3,4,5	1
Trinaxus Lake	13B01	6560	9	25N	17W	1948	3,4,5	1
Twin Creeks	13B11	3580	24	26N	16W	1951	1,2,3,4,5	1,2
Upper Holland Lake	13B05	7000	28	20N	15W	1948	3,4,5	1
CLARK FORK RIVER								
Black Pine	13C13	7100	23	8N	15W	1959	3,4,5	1
Copper Creek	12B10	5700	1	15N	9W	1962	3,4,5	1,2
Cotter Mine	12B11	6250	2	15N	9W	1962	3,4,5	1,2
Coyote Hill	13B10	4200	12	18N	16W	1947	1,2,3,4,5	1,2
El Dorado Mine	13C09	7800	23	8N	12W	1949	3,4	1
Fred Burr Pass	13C11	8000	12	6N	13W	1957	3,4,5	1
Gold Creek Lake	13C10	7200	14	8N	12W	1949	3,4	1
Hoodoo Creek	15C01	6200	9	14N	27W	1937	3,4,5	1,2
Intergard	13C04	6450	6	5N	13W	1936	2,3,4,5	4
Lubrecht Forest No. 3	13C21	5450	19	13N	14W	1951	1,2,3,4,5	8
Lubrecht Forest No. 4	13C22	4650	23	13N	15W	1951	1,2,3,4,5	8
Lubrecht Forest No. 6	13C08	4040	11	13N	15W	1951	1,2,3,4,5	8
Red Lion	13C12	7100	22	6N	13W	1958	3,4,5	1
Skalkaho Summit	13C03	7260	30	6N	17W	1937	3,4,5,5½,6	1
Slide Rock Mountain	13C02	7100	35	10N	16W	1937	3,4,5	1
Southern Cross	13C05	6500	8	5N	13W	1936	2,3,4	4
Storm Lake	13C07	7780	19	4N	13W	1939	1,2,3,4,5	1
Stuart Mill	13C06	6500	19	5N	13W	1936	2,3,4	4
Stuart Mountain	13C01	7400	6	14N	18W	1936	1,2,3,4,5, 6	8
TV Mountain	14B01	6800	33	15N	19W	1956	1,2,3,4,5	8
BITTERROOT RIVER								
Ambrose	13C16	6480	28	9N	18W	1960	3,4,5	1
East Fork R. S.	13D01	5400	16	2N	17W	1937	3,4	1
Gibbons Pass	13D02	7100	4	2S	19W	1934	1,2,3,4,5,5½,6	1,3
Lost Horse	14C07	5940	5	4N	23W	1960	3,4,5	1
Nez Perce Camp	14D02	5580	19	1S	23W	1937	3,4,5	1
Nez Perce Pass	14D01	6570	25	1S	24W	1937	3,4,5	1
Twin Lakes	14C08	6510	32	5N	23W	1960	3,4,5	1
SASKATCHEWAN RIVER BASIN								
Iceberg Lake No. 3	13A03	5600	1	35N	17W	1922	5	3,9
Josephine Lower No. 9	13A14	4900	22	35N	16W	1955	5	3,9
Mount Allen No. 7	13A07	5700	27	35N	16W	1922	5	3,9
Piegan Pass No. 6	13A06	5500	27	35N	16W	1922	5	3,9
Ptarmigan No. 8	13A08	5800	36	36N	17W	1937	5	3,9

MISSOURI RIVER BASIN

Drainage Basin & Course Name	Number	Elev.	Sec.	Twp.	Range	Record Began	Measuring Dates 1/	Meas. By 2/
BEAVERHEAD RIVER								
Bloody Dick	13E10	7600	12	8S	16W	1948	3,4,5	1
Carter Creek	12E04	7400	22	8S	7W	1963	3,4	1
Gold Stone	13E09	8100	11	8S	16W	1948	3,4,5	1
Lakeview Canyon	11E04	6930	26	14S	2W	1948	3,4,5	10
Lakeview Ridge	11E03	7400	27	14S	2W	1948	3,4,5	10
Lemhi Pass	13E01	7480	9	10S	15W	1948	3,4	1
Trail Creek	13E02	7090	15	10S	15W	1948	3,4	1
White Pine Ridge	12E01	8850	18	14S	9W	1948	3,4,5	1
RUBY RIVER								
Clover Meadow	11D08	8600	28	9S	2W	1963	3,4,5	1
Divide	12E07	7900	14	12S	4W	1963	3,4,5	1
Notch	12E06	8500	18	11S	4W	1963	3,4,5	1
BIG HOLE RIVER								
Abundance Lake	13D20	8800	7	3S	11W	1963	3,4,5	1
Darkhorse Lake	13D19	8600	4	8S	16W	1963	3,4,5	1
Elk Horn Springs	13D15	7800	21	4S	12W	1935	3,4,5	3
Foolhen	13D21	8500	11	1S	13W	1963	3,4,5	1
Jahnke Creek	13D08	7340	25	7S	16W	1948	3,4,5	1
JEFFERSON RIVER								
Berry Meadow	12C07	7300	17	5N	5W	1962	3,4,5	1
Picnic Grounds	12C06	6500	10	5N	6W	1941	2,3,4	4
Pipestone Pass	12D01	7200	10	1N	7W	1938	1,2,3,4,5	1
MADISON RIVER								
Call Road	11D07	8050	21	8S	2W	1962	3,4,5	1
Crockett Lake	11D06	8400	20	8S	2W	1962	3,4,5	1
Hebgen Dam	11E05	6550	22	11S	3E	1934	1,2,3,4,5	3
Jack Creek	11D05	6800	13	6S	1E	1961	3,4	1
North Meadow	11D03	7500	23	3S	3W	1961	3,4	1
West Yellowstone	11E07	6700	34	13S	5E	1934	1,2,3,4,5	3
GALLATIN RIVER								
Arch Falls	10D14	7350	3	5S	6E	1963	2,3,4,5	1
Bear Basin	11D09	8150	9	6S	3E	1963	3,4,5	1
Devil's Slide	10D04	8100	14	5S	6E	1935	2,3,4,5, 6	1
Hood Meadow	10D03	6600	22	4S	6E	1935	2,3,4,5	1
Little Park	11D10	7400	22	6S	3E	1963	3,4,5	1
New World	10D01	6700	24	3S	6E	1939	2,3,4	1
Twenty-One Mile	11E06	7150	1	11S	5E	1934	1,2,3,4,5	3
MISSOURI RIVER MAIN STEM								
Boulder Mountain	11C01	7950	1	9N	3E	1963	3,4	1
Chessman Reservoir	12C05	6200	2	8N	5W	1936	1,2,3,4,5	3
Crystal Lake	9C01	6100	19	12N	18E	1941	3,4	1
Elk Peak	10C07	8000	10	8N	8E	1963	3,4,5	1
Grasshopper	10C02	7000	19	9N	8E	1938	3,4	1
Kings Hill	10C01	7500	34	13N	8E	1934	3,4,5	3
Rocky Boy	9A01	5200	15	28N	16E	1941	3,4	7
Steeple Pass	12C01	6900	16	13N	7W	1934	3,4,5	3
Ten Mile Lower	12C02	6250	13	8N	6W	1935	1,2,3,4,5	3
Ten Mile Middle	12C03	6800	13	8N	6W	1934	1,2,3,4,5	3
Ten Mile Upper	12C04	8000	19	8N	5W	1935	1,2,3,4,5	3
SUN-TETON-MARIAS RIVERS								
Cabin Creek	12B06	5400	33	23N	10W	1949	3,4,5	1
Five-Bull	12B09	5600	36	20N	10W	1948	3,4	1
Freight Creek	12A01	6000	13	26N	10W	1948	3,4,5	1
Goat Mountain	12B07	7000	20	22N	10W	1934	3,4,5	3
Waldron Creek	12B02	5600	16	25N	9W	1948	3,4,5	1
West Fork	12B01	6000	6	25N	9W	1948	3,4,5	1
Wrong Creek	12B04	5700	32	25N	10W	1949	3,4,5	1
Wrong Ridge	12B03	6800	17	25N	10W	1949	3,4,5	1
JUDITH RIVER								
Spur Park	10C06	8000	20	12N	9E	1963	3,4,5	1
UPPER YELLOWSTONE RIVER								
Bald Ridge	10C05	7500	11	4N	10E	1961	3,4,5	1
Camp Sencis	9D01	7890	2	8S	18E	1937	3,4,5	1
Crevice Mountain	10D05	8400	22	9S	9E	1935	3,4	2
Grizzly Peak	9D05	8400	26	7S	19E	1961	1,2,3,4,5	1
Independence	10D06	8000	22	7S	12E	1940	3,4,5	1
Monument Peak	10D12	9000	22	7S	12E	1961	3,4,5	1
Northeast Entrance	10D07	7400	33	9S	14E	1937	1,2,3,4,5	6
Porcupine R. S.	10D03	6500	10	4N	10E	1938	3,4,5	1
Timberline Creek	9D04	8850	10	8S	18E	1961	3,4,5	1
Sacajawea	10D10	6550	36	2N	6E	1960	3,4,5	1
West Rosebud	9D02	7500	9	7S	16E	1960	3,4	4

SOIL MOISTURE STATIONS

COLUMBIA RIVER BASIN

Drainage Basin & Course Name	Number	Elev.	Sec.	Twp.	Range	Record Began	Measuring Dates 1/	Meas. By 2/
FLATHEAD RIVER								
Desert Mountain	13A02M	5600	24	31N	19W	1956	Monthly	1
Marias Pass	13A05M	5250	34	30N	14W	1950	Monthly	1
CLARK FORK RIVER								
Georgetown Lake	13C15M	6450	6	5N	13W	1962	Monthly	1
Lubrecht Forest	13C14M	4100	11	13N	15W	1961	Monthly	8
Seeley Lake	13B19M	4030	21	17N	15W	1963	Monthly	2
BITTERROOT RIVER								
Gibbons Pass	13D18M	7100	4	2S	19W	1962	Monthly	1
Lolo Pass	14C05M	5250	11	10N	20W	1963	Monthly	1

MISSOURI RIVER BASIN

Drainage Basin & Course Name	Number	Elev.	Sec.	Twp.	Range	Record Began	Measuring Dates 1/	Meas. By 2/
BEAVERHEAD RIVER								
Lakeview	11E13M	6700	23	14S	2W	1962	Monthly	10
MADISON RIVER								
Red Bluff	11D04M	4800	7	3S	1E	1961	Monthly	7
GALLATIN RIVER								
College Site	11D02M	4856	18	2S	5E	1956	Monthly	1
Twenty-One Mile	11E06M	7150	1	11S	5E	1963	Monthly	6
MISSOURI RIVER MAIN STEM								
Steeple Pass	12C08M	6350	16	13N	7W	1963	Monthly	1
Kings Hill	10C01M	7420	34	13N	8E	1963	Monthly	1
YELLOWSTONE RIVER								
Battle Ridge	10D11M	6020	32	2N	7E	1960	Monthly	1
Northeast Entrance	10D07M	7350	33	9S	14E	1962	Monthly	6
Shields River	10C04M	5850	4	1N	10E	1960	Monthly	1

LEGEND

1/ Numerals 1,2,3,4,5,5½,6 refer to January 1, February 1, March 1, April 1, May 1, May 15 and June 1.

2/ Numerals refer to Agency that secures the snow survey as follows:

1. Soil Conservation Service
2. U. S. Forest Service
3. U. S. Geological Survey
4. Montana Power Company
5. U. S. Indian Service
6. National Park Service
7. Montana Experiment Station
8. Montana State Forestry School
9. Dominion Water & Power Bureau
10. Bureau of Sport Fisheries & Wildlife

M - Soil Moisture

SOIL MOISTURE DATA

AS OF FEBRUARY 1, 1964

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE
			COLUMBIA RIVER BASIN					
Flathead								
13A02M	Desert Mountain	5600	54	8.4	1/31	5.8	7.2	7.0
13A05M	Marias Pass	5250	54	6.5	1/28	4.4	5.3	5.0
Clark Fork								
13C15M	Georgetown Lake	6450	48	8.3	1/27	2.4	3.2	-
13B19M	Seeley Lake	4030	48	10.6	1/31	1.6	-	-
Bitterroot								
13D18M	Gibbons Pass	7100	48	7.1	1/29	5.5	5.8	-
14C05M	Lolo Pass	5250	48	8.5	1/28	5.2	-	-
			MISSOURI RIVER BASIN					
Beaverhead								
11E13M	Lakeview	6700	48	15.3	1/31	8.3	5.4	-
Madison								
10D04M	Red Bluff	4800	40	4.7	1/30	1.5	2.7	-
Gallatin								
11D02M	College Site	4856	54	14.5	1/31	6.8	12.5	9.0
11E06M	Twenty-One Mile	7150	48	8.8	1/28	3.8	-	-
Missouri Main Stem								
10C01M	Kings Hill	7420	48	11.8	1/31	7.7	-	-
12C08M	Stemple Pass	6350	48	5.9	1/30	3.9	-	-
Yellowstone								
10D11M	Battle Ridge	6020	48	15.4	1/31	9.3	13.8	-
10D07M	Northeast Entrance	7350	48	9.4	1/31	7.9	7.2	-
10C04M	Shields River	5850	48	17.8	1/31	8.9	10.0	-

**AVERAGE FOR PERIOD OF RECORD

SOIL MOISTURE DATA

AS OF FEBRUARY 1, 1964

(Inches)

SOIL MOISTURE STATION				SOIL PROFILE		CURRENT DATA		PAST RECORD	
No.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE
	COLUMBIA RIVER BASIN							
	Athead							
02M	Desert Mountain	5600	54	8.4	1/31	5.8	7.2	7.0
03M	Marias Pass	5250	54	6.5	1/28	4.4	5.3	5.0
	rk Fork							
21M	Georgetown Lake	6450	48	8.3	1/27	2.4	3.2	-
19M	Seeley Lake	4030	48	10.6	1/31	1.6	-	-
	tterroot							
01M	Gibbons Pass	7100	48	7.1	1/29	5.5	5.8	-
05M	Lolo Pass	5250	48	8.5	1/28	5.2	-	-
	MISSOURI RIVER BASIN							
	verhead							
13M	Lakeview	6700	48	15.3	1/31	8.3	5.4	-
	ison							
04M	Red Bluff	4800	40	4.7	1/30	1.5	2.7	-
	latin							
02M	College Site	4856	54	14.5	1/31	6.8	12.5	9.0
06M	Twenty-One Mile	7150	48	8.8	1/28	3.8	-	-
	ourt Main Stem							
01M	King Hill	7420	48	11.8	1/31	7.7	-	-
08M	Stemple Pass	6350	48	5.9	1/30	3.9	-	-
	lowstone							
11M	Battle Ridge	6020	48	15.4	1/31	9.3	13.8	-
07M	Northeast Entrance	7350	48	9.4	1/31	7.9	7.2	-
04M	Shields River	5850	48	17.8	1/31	8.9	10.0	-

ACE FOR PERIOD OF RECORD

SNOW SURVEY DATA

AS OF FEBRUARY 1, 1964

(Inches)

SNOW COURSE			CURRENT DATA			PAST RECORD	
						WATER CONTENT	
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE
	COLUMBIA RIVER BASIN						
OOTENAI RIVER							
C 10	Fernie	3500	1/31	34	4.5	2.2	7.3
C 12A	Field	4200	1/31	20	4.1	3.8	4.5
C 43	Gray Creek	5100	1/29	47	11.6	10.6	12.5*
C 33	Kicking Horse	5400	1/31	40	9.7	10.3	10.9*
C 20B	Kimberley	3800				-	6.2*
C 32	Marble Canyon	5000	1/31	33	8.8	8.0	11.1*
C 10B	Morrissey Ridge	6100				15.8	-
10A	New Fernie	4100	1/31	47	5.4	6.3	11.1*
C 8A	Sinclair Pass	4500	1/31	20	3.8	3.3	4.7*
C 20A	Sullivan Mine	5100	1/31	36	8.2	8.8	9.6*
LATHEAD RIVER							
3A02	Desert Mountain	5600	1/31	39	10.8	6.7	10.8*
4A03	Hell Roaring Divide	5770	1/28	68	20.2	-	-
3B13	Holbrook	4530	1/29	33	6.2	4.7	7.5*
3A05	Marias Pass	5250	1/28	44	10.2	7.3	13.0
3B02	Spotted Bear Mt.	7000	1/29	37	7.4	6.4	11.0*
3B11	Twin Creeks	3580	1/29	36	8.6	3.8	8.8*
LARK FORK RIVER							
3B10	Coyote Hill	4200	1/31	31	6.7	5.0	8.0*
C04	Intergaard	6450	1/31	23	4.9	5.6	4.9*
02	Lookout	5250	1/30	97	26.7	14.5	25.8*
3C21	Lubrecht Forest No. 3	5450	1/26	38	8.6	3.8	3.9*
3C22	Lubrecht Forest No. 4	4650	1/26	21	4.0	2.6	2.1*
3C08	Lubrecht Forest No. 6	4040	1/26	25	4.3	3.4	2.6*
3C05	Southern Cross	6500	1/31	18	4.1	5.0	3.8*
3C18	Spring Gulch	6000	2/1	38	9.0	8.4	-
3C07	Storm Lake	7780	1/28	34	7.0	10.6	8.8*
3C06	Stuart Mill	6500	1/31	22	4.8	5.1	4.3*
3C01	Stuart Mountain	7400	2/1	74	22.1	17.6	22.2*
4B01	TV Mountain	6800	1/26	47	10.6	11.0	11.2*
ITTERROOT RIVER							
3D02	Gibbons Pass	7100	1/29	67	16.8	10.8	16.4*
3D16	Moose Creek	6200	1/28	59	14.0	5.7	12.2*

TE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). *ADJUSTED AVERAGE

SNOW SURVEY DATA

AS OF FEBRUARY 1, 1964

(Inches)

Snow Course			Current Data			Past Record		
No.	Name	Elevation	Date of Survey	Snow Depth	Water Content	Water Content		
						Last Year	Average	
	COLUMBIA RIVER BASIN							
	TENAL RIVER							
10	Fernie	3500	1/31	34	4.5	2.2	7.3	
12A	Field	4200	1/31	20	4.1	3.8	4.5	
43	Gray Creek	5100	1/29	47	11.6	10.6	12.5*	
33	Kicking Horse	5400	1/31	40	9.7	10.3	10.9*	
20B	Kimberley	3800				-	6.2*	
32	Marble Canyon	5000	1/31	33	8.8	8.0	11.1*	
10B	Mortissey Ridge	6100				15.8	-	
10A	New Fernie	4100	1/31	47	5.4	6.3	11.1*	
8A	Sinclair Pass	4500	1/31	20	3.8	3.3	4.7*	
20A	Sullivan Mine	5100	1/31	36	8.2	8.8	9.6*	
	THEAD RIVER							
02	Desert Mountain	5600	1/31	39	10.8	6.7	10.8*	
03	Hall Roaring Divide	5770	1/28	68	20.2	-	-	
13	Holbrook	4530	1/29	33	6.2	4.7	7.5*	
05	Marias Pass	5250	1/28	44	10.2	7.3	13.0	
02	Spotted Bear Mt.	7000	1/29	37	7.4	6.4	11.0*	
1	Twin Creeks	3580	1/29	36	8.6	3.8	8.8*	
	R FORK RIVER							
0	Coyote Hill	4200	1/31	31	6.7	5.0	8.0*	
4	Intergard	6450	1/31	23	4.9	5.6	4.9*	
2	Lookout	5250	1/30	97	26.7	14.5	25.8*	
1	Lubrecht Forest No. 3	5450	1/26	38	8.6	3.8	3.9*	
2	Lubrecht Forest No. 4	4650	1/26	21	4.0	2.6	2.1*	
8	Lubrecht Forest No. 6	4040	1/26	25	4.3	3.4	2.6*	
5	Southern Cross	6500	1/31	18	4.1	5.0	3.8*	
8	Spring Gulch	6000	2/1	38	9.0	8.4	-	
7	Storm Lake	7780	1/28	34	7.0	10.6	8.8*	
6	Stuart Mill	6500	1/31	22	4.8	5.1	4.3*	
1	Stuart Mountain	7400	2/1	74	22.1	17.6	22.2*	
1	TV Mountain	6800	1/26	47	10.6	11.0	11.2*	
	ERFOOT RIVER							
2	Gibbons Pass	7100	1/29	67	16.8	10.8	16.4*	
6	Moose Creek	6200	1/28	59	14.0	5.7	12.2*	

*ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "ADJUSTED AVERAGE

SNOW SURVEY DATA

AS OF FEBRUARY 1, 1964

(Inches)

SNOW COURSE			CURRENT DATA			PAST RECORD	
						WATER CONTENT	
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE
MISSOURI RIVER BASIN							
BEAVERHEAD RIVER							
12E03	Camp Creek	6800	1/28	25	5.0	2.9	7.0
11E12	Kilgore	6200	1/28	28	6.0	3.1	7.2
JEFFERSON RIVER							
12C06	Picnic Grounds	6500	1/31	15	3.0	3.5	3.7*
12D01	Pipestone Pass	7200	1/27	15	3.2	5.4	3.2*
MADISON RIVER							
11E09	Big Springs	6500	1/28	49	11.4	6.2	14.5
11E05	Hebgen Dam	6550	1/30	34	7.2	5.3	8.6
11E10	Island Park	6315	1/28	42	8.7	4.9	11.3
10E02	Norris Basin	7500	1/30	36	8.5	7.3	7.1*
11E08	Valley View	6500	1/28	45	11.5	7.6	10.9*
11E07	West Yellowstone	6700	1/30	32	6.8	3.8	8.8
GALLATIN RIVER							
10D14	Arch Falls	7350	2/1	28	6.4	-	-
10D04	Devil's Slide	8100	2/1	48	11.9	14.6	11.9*
10D03	Hood Meadow	6600	1/31	21	4.6	8.7	5.1*
10D01	New World	6700	1/30	29	6.2	8.4	6.3*
11E06	Twenty-One Mile	7150	1/29	48	11.0	6.4	13.0
MISSOURI RIVER (Main Stem)							
12C05	Chessman Reservoir	6200	No measurement			3.8	3.4
12C02	Tenmile Lower	6250	2/4	22	5.4	5.1	5.1
13C03	Tenmile Middle	6800	2/4	31	7.8	7.1	7.4
12C04	Tenmile Upper	8000	2/4	38	10.4	9.7	9.4
UPPER YELLOWSTONE RIVER							
10E03	Canyon	7750	1/30	42	10.0	7.2	10.4*
10E06	East Entrance	7000	1/31	31	6.8	6.7	8.1*
9D05	Grizzly Peak	8400	1/30	19	4.1	10.3	-
10E04	Lake Camp No. 2	7850	1/30	30	4.4	3.0	7.4*
9E01	Lodgepole	8200	1/30	32	6.7	6.6	8.3*
10E01	Lupine Creek	7300	1/31	28	6.0	5.4	7.1*
10D07	Northeast Entrance	7400	1/31	24	5.4	6.0	6.0*
10E05	Sylvan Pass	7100	1/31	38	8.8	5.6	10.2*
10E07	Thumb Divide	7900	1/29	49	11.8	8.6	15.9*

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). *ADJUSTED AVERAGE

SNOW SURVEY DATA

AS OF FEBRUARY 1, 1964

(inches)

SNOW COURSE			CURRENT DATA			PAST RECORD		
No.	Name	Elevation	Date of Survey	Snow Depth	Water Content	Water Content		
						Last Year	Average	
MISSOURI RIVER BASIN								
BEAVERHEAD RIVER								
2E03	Camp Creek	6800	1/28	25	5.0	2.9	7.0	
1E12	Kilgore	6200	1/28	28	6.0	3.1	7.2	
JEFFERSON RIVER								
2C06	Pionie Grounds	6500	1/31	15	3.0	3.5	3.7*	
2D01	Pipestone Pass	7200	1/27	15	3.2	5.4	3.2*	
MADISON RIVER								
1E09	Big Springs	6500	1/28	49	11.4	6.2	14.5	
1E05	Hebgen Dam	6550	1/30	34	7.2	5.3	8.6	
1E10	Island Park	6315	1/28	42	8.7	4.9	11.3	
1E02	Norris Basin	7500	1/30	36	8.5	7.3	7.1*	
1E08	Valley View	6500	1/28	45	11.5	7.6	10.9*	
1E07	West Yellowstone	6700	1/30	32	6.8	3.8	8.8	
MALADIN RIVER								
1D14	Arch Falls	7350	2/1	28	6.4	-	-	
1D04	Devil's Slide	8100	2/1	48	11.9	14.6	11.9*	
1D03	Hood Meadow	6600	1/31	21	4.6	8.7	5.1*	
1D01	New World	6700	1/30	29	6.2	8.4	6.3*	
1E06	Twenty-One Mile	7150	1/29	48	11.0	6.4	13.0	
MISSOURI RIVER (Main Stem)								
2C05	Chessman Reservoir	6200	No measurement			3.8	3.4	
2C02	Tenmile Lower	6250	2/4	22	5.4	5.1	5.1	
2C03	Tenmile Middle	6800	2/4	31	7.8	7.1	7.4	
2C04	Tenmile Upper	8000	2/4	38	10.4	9.7	9.4	
UPPER YELLOWSTONE RIVER								
1E03	Canyon	7750	1/30	42	10.0	7.2	10.4*	
1E06	East Entrance	7000	1/31	31	6.8	6.7	8.1*	
1E05	Grizzly Peak	8400	1/30	19	4.1	10.3	-	
1E04	Lake Camp No. 2	7850	1/30	30	4.4	3.0	7.4*	
1E01	Lodgepole	8200	1/30	32	6.7	6.6	8.3*	
1E01	Lupine Creek	7400	1/31	28	6.0	5.4	7.1*	
1D07	Northeast Entrance	7400	1/31	24	5.4	6.0	6.0*	
1E05	Sylvan Pass	7100	1/31	38	8.8	5.6	10.2*	
1E07	Thumb Divide	7800	1/29	49	11.8	8.6	15.9*	

* ALL AVERAGES BASED ON 1949-1957 (15 YEAR PERIOD). "AD-JUSTED AVERAGE

RESERVOIR STORAGE DATA

AS OF JANUARY 31, 1964

(1000 Acre Feet)

BASIN	RESERVOIR	USEABLE CAPACITY	USEABLE STORAGE THIS YEAR	USEABLE STORAGE LAST YEAR	USEABLE STORAGE AVERAGE
COLUMBIA RIVER BASIN					
Flathead	Hungry Horse	3,428.0	2,450.0	2,775.0	2,620.0**
	Flathead Lake	1,791.0	1,591.0	1,399.0	991.7
	Camas 1/	45.2	17.9	26.7	23.6
	Mission Valley 2/	100.3	18.9	27.3	31.6
Clark Fork	Georgetown Lake	31.0	28.9	26.2	24.0
	Noxon	334.6	-	311.1	-
Bitterroot	Como	34.9	5.3	17.1	10.4
	Painted Rocks	31.7	22.8	-	10.1**
MISSOURI RIVER BASIN					
Beaverhead	Lima	84.0	-	24.5	32.8
Ruby	Ruby	38.8	-	18.5	25.8**
Madison	Hebgen Lake	384.8	211.3	233.6	223.3
	Ennis Lake	41.0	39.2	39.1	35.7
Gallatin	Middle Creek	8.0	2.9	4.3	3.4**
Missouri	Canyon Ferry	2,043.0	1,732.0	1,951.0	1,612.0**
	Hauser & Helena	61.9	48.9	48.4	49.3
	Lake Helena	10.4	6.0	5.9	7.1**
	Holter Lake	81.9	56.9	34.0	62.1
	Smith River	10.7	7.4	7.2	5.2**
	Ackley Lake	5.8	-	3.8	3.9
	Durand	7.0	3.9	5.4	4.6
	Martinsdale	23.1	8.2	8.6	9.5
	Deadman's Basin	72.2	48.2	47.4	48.6**
	Fort Peck	19,410.0	11,720.0	9,878.0	11,030.0
Sun-Teton	Gibson	105.0	16.4	37.3	59.9
	Willow Creek	32.3	21.0	25.5	18.7
	Pishkun	32.0	17.5	18.4	19.3
Marias	Lower Two Medicine	16.6	-	-	0
	Four Horns	19.2	-	-	8.4
	Swift	30.0	10.3	10.1	20.9
	Lake Francis	112.0	33.2	65.0	88.4
	Tiber	1,313.0	642.3	628.1	629.5**
Milk	Fresno	127.2	39.8	33.1	64.0
	Nelson	66.8	33.2	45.9	35.6
	Lake Sherburne	66.1	16.0	-	18.7
Yellowstone	Mystic Lake	20.8	11.2	11.1	11.3
	Tongue River	68.0	40.7	30.9	7.4
	Cooney	27.5	-	14.9	9.1

1/ Sum of four small reservoirs on west side of Flathead Lake.
2/ Sum of eight small reservoirs in Mission Valley not including Jocko Lake.

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). **AVERAGE FOR PERIOD OF RECORD

RESERVOIR STORAGE DATA

AS OF JANUARY 31, 1964

(1000 Acre Feet)

BASIN	RESERVOIR	USEABLE CAPACITY	USEABLE STORAGE: THIS YEAR	USEABLE STORAGE: LAST YEAR	USEABLE STORAGE: AVERAGE
COLUMBIA RIVER BASIN					
Flathead	Hungry Horse	3,426.0	2,450.0	2,775.0	2,620.0**
	Flathead Lake	1,791.0	1,491.0	1,399.0	991.7
	Camas 1/	45.2	17.9	26.7	23.6
Clark Fork	Mission Valley 2/	100.3	18.9	27.3	31.6
	Georgetown Lake	31.0	28.9	26.2	24.0
	Noxon	334.6	-	311.1	-
Bitterroot	Como	34.9	5.3	17.1	10.4
	Painted Rocks	31.7	22.8	-	10.1**
MISSOURI RIVER BASIN					
Beaverhead	Lima	84.0	-	24.5	32.8
Ruby	Ruby	38.8	-	18.5	25.8**
Madison	Hebgen Lake	384.8	211.3	233.6	223.3
	Ennis Lake	41.0	39.2	39.1	35.7
Gallatin	Middle Creek	8.0	2.9	4.3	3.4**
Missouri	Canyon Ferry	2,043.0	1,232.0	1,991.0	1,612.0**
	Hauser & Helena	61.9	48.9	44.4	49.3
	Lake Helena	10.4	6.0	5.9	7.1**
	Holter Lake	81.9	56.9	34.0	62.1
	Smith River	10.7	7.4	7.2	5.2**
	Ackley Lake	5.8	-	3.8	3.9
	Durand	7.0	3.9	5.4	4.6
	Martinsdale	23.1	8.2	8.6	9.5
	Deadman's Basin	72.2	48.2	47.4	48.6**
	Fort Peck	19,410.0	11,720.0	9,878.0	11,030.0
Sun-Teton	Gibson	105.0	16.4	32.3	39.9
	Willow Creek	32.3	21.0	25.5	18.7
	Pishkun	32.0	17.5	18.4	19.3
Marias	Lower Two Medicine	16.6	-	-	0
	Four Horns	19.2	-	-	8.4
	Swift	30.0	10.3	10.1	20.9
	Lake Francis	112.0	33.2	65.0	88.4
	Tiber	1,313.0	642.3	628.1	529.5**
Milk	Fresno	127.2	39.8	33.1	64.0
	Nelson	66.8	33.2	45.9	35.6
	Lake Sherburne	66.1	16.0	-	18.7
Yellowstone	Nyelle Lake	20.8	11.2	11.1	11.3
	Tongue River	68.0	40.7	30.9	7.4
	Cooney	27.5	-	14.9	9.1

1/ Sum of four small reservoirs on west side of Flathead Lake.
2/ Sum of eight small reservoirs in Mission Valley not including Jocko Lake.

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). **AVERAGE FOR BASIN OF STORAGE

Agencies Cooperating in Collecting Data Contained in this Bulletin

U. S. Forest Service
Region 1, Missoula, Montana

U. S. Geological Survey
Helena, Montana

U. S. Army Corps of Engineers
Portland, Oregon
Seattle, Washington
Omaha, Nebraska
Riverdale, N. D.

U. S. Indian Irrigation Service
St. Ignatius, Montana

U. S. Weather Bureau
Helena, Montana

U. S. Bureau of Sports Fisheries and Wildlife
Red Rock Lakes Refuge
Monida, Montana

U. S. Bureau of Reclamation
Billings, Montana
Boise, Idaho

Montana Power Company
Butte, Montana

Agricultural Experiment Station
North Montana Branch Station
Havre, Montana

Agricultural Experiment Station
North Montana Branch Station
Havre, Montana

National Park Service
Yellowstone National Park
Glacier National Park

Montana Experiment Station
Montana State College
Bozeman, Montana

Bonneville Power Administration
Portland, Oregon

Montana State University
School of Forestry
Missoula, Montana

Soil Conservation Service
Montana, Wyoming, Idaho

Soil Conservation Districts
Montana Counties

Johnson Flying Service, Inc.
Missoula, Montana

Water Rights Branch, Dept. of Lands and Forests
Victoria, British Columbia

Department of Northern Affairs and National Resources
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